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John A. Ventosa  
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NL-12-175

December 11, 2012

U.S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Mail Stop O-P1-17  
Washington, D.C. 20555-0001

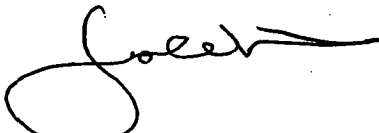
SUBJECT: Licensee Event Report # 2012-004-00, "Automatic Reactor Trip as a Result of a Turbine-Generator Trip Due to a Loss of 345 kV Feeders W97 and W98 Caused by Storm Damage to Feeder Insulators"  
Indian Point Unit No. 3  
Docket No. 50-286  
DPR-64

Dear Sir or Madam:

Pursuant to 10 CFR 50.73(a)(1), Entergy Nuclear Operations Inc. (ENO) hereby provides Licensee Event Report (LER) 2012-004-00. The attached LER identifies an event where the reactor was automatically tripped, which is reportable under 10 CFR 50.73(a)(2)(iv)(A). As a result of the reactor trip, the Auxiliary Feedwater System was actuated, which is also reportable under 10 CFR 50.73(a)(2)(iv)(A). This condition was recorded in the Entergy Corrective Action Program as Condition Report CR-IP3-2012-03425.

There are no new commitments identified in this letter. Should you have any questions regarding this submittal, please contact Mr. Robert Walpole, Manager, Licensing at (914) 254-6710.

Sincerely,



JAV/cbr

cc: Mr. William Dean, Regional Administrator, NRC Region I  
NRC Resident Inspector's Office, Indian Point 3  
Mrs. Bridget Frymire, New York State Public Service Commission  
LEREvents@INPO.org

IEZZ  
NRR

## LICENSEE EVENT REPORT (LER)

Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the Records and FOIA/Privacy Service Branch (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to [infocollects.resource@nrc.gov](mailto:infocollects.resource@nrc.gov), and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.

1. FACILITY NAME: INDIAN POINT 3

2. DOCKET NUMBER  
05000-2863. PAGE  
1 OF 4

4. TITLE: Automatic Reactor Trip as a Result of a Turbine-Generator Trip Due to a Loss of 345 kV Feeders W97 and W98 Caused by Storm Damage to Feeder Insulators

5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV. NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
10	29	2012	2012	004 - 00		12	11	2012	FACILITY NAME	DOCKET NUMBER 05000
9. OPERATING MODE  1			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check all that apply)							
10. POWER LEVEL  100%			<input type="checkbox"/> 20.2201(b)	<input type="checkbox"/> 20.2203(a)(3)(i)	<input type="checkbox"/> 50.73(a)(2)(i)(C)	<input type="checkbox"/> 50.73(a)(2)(vii)				
			<input type="checkbox"/> 20.2201(d)	<input type="checkbox"/> 20.2203(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(ii)(A)	<input type="checkbox"/> 50.73(a)(2)(viii)(A)				
			<input type="checkbox"/> 20.2203(a)(1)	<input type="checkbox"/> 20.2203(a)(4)	<input type="checkbox"/> 50.73(a)(2)(ii)(B)	<input type="checkbox"/> 50.73(a)(2)(viii)(B)				
			<input type="checkbox"/> 20.2203(a)(2)(i)	<input type="checkbox"/> 50.36(c)(1)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(iii)	<input type="checkbox"/> 50.73(a)(2)(ix)(A)				
			<input type="checkbox"/> 20.2203(a)(2)(ii)	<input type="checkbox"/> 50.36(c)(1)(ii)(A)	<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)	<input type="checkbox"/> 50.73(a)(2)(x)				
			<input type="checkbox"/> 20.2203(a)(2)(iii)	<input type="checkbox"/> 50.36(c)(2)	<input type="checkbox"/> 50.73(a)(2)(v)(A)	<input type="checkbox"/> 73.71(a)(4)				
			<input type="checkbox"/> 20.2203(a)(2)(iv)	<input type="checkbox"/> 50.46(a)(3)(ii)	<input type="checkbox"/> 50.73(a)(2)(v)(B)	<input type="checkbox"/> 73.71(a)(5)				
			<input type="checkbox"/> 20.2203(a)(2)(v)	<input type="checkbox"/> 50.73(a)(2)(i)(A)	<input type="checkbox"/> 50.73(a)(2)(v)(C)	<input type="checkbox"/> OTHER				
			<input type="checkbox"/> 20.2203(a)(2)(vi)	<input type="checkbox"/> 50.73(a)(2)(i)(B)	<input type="checkbox"/> 50.73(a)(2)(v)(D)	Specify in Abstract below or in NRC Form 366A				

## 12. LICENSEE CONTACT FOR THIS LER

NAME  
Christopher Ingrassia, System EngineerTELEPHONE NUMBER (Include Area Code)  
(914) 254-7047

## 13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX

## 14. SUPPLEMENTAL REPORT EXPECTED

☐ YES (If yes, complete 15. EXPECTED SUBMISSION DATE) ☒ NO

## 15. EXPECTED SUBMISSION DATE

MONTH	DAY	YEAR

## 16. ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced type written lines)

On October 29, 2012, an automatic reactor trip (RT) was initiated as a result of a main turbine-generator trip due to a trip of the Generator Primary and Backup Lockout relay 86P and 86BU on a direct trip from the Buchanan switchyard. The Buchanan switchyard south ring bus was isolated from output feeder W96 as a result of faults on 345 kV feeders W97 and W98 causing the generator output breakers 1 and 3 to open initiating a direct trip signal from Buchanan. All control rods fully inserted and all required safety systems functioned properly. The plant was stabilized in hot standby with decay heat being removed by the main condenser. The Auxiliary Feedwater System automatically started as expected due to SG low level from shrink effect. The Emergency Diesel Generators did not start as offsite power remained available and stable. The cause of the RT was the trip of generator output breakers 1 and 3 due to isolation of the south ring bus from output feeder W96. Generator output breakers 1 and 3 tripped as a result of a fault on feeders W97 and W98 due to Con Edison 345 kV feeder line insulator damage from the effects of superstorm Sandy. Corrective action was taken to repair 345 kV feeders W97 and W98 by Con Edison. The event had no effect on public health and safety.

## LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET (2)	LER NUMBER (6)			PAGE (3)
		YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	
Indian Point Unit 3	05000-286	2012	- 004	- 00	2 OF 4

## NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

Note: The Energy Industry Identification System Codes are identified within the brackets {}.

## DESCRIPTION OF EVENT

At 22:40 hours, on October 29, 2012, while at 100% steady state reactor power, the Control Room (CR) {NA} received a 345 kV breaker #1 trip alarm. At 22:41 hours, the CR received a Reactor Trip (RT) {JC} due to Direct Trip from the Buchanan switchyard {FK}. The automatic reactor trip was initiated as a result of a Main Turbine {TA} Generator {TB} trip due to a trip of the Generator Primary and Backup Lockout Relay (86P and 86BU) on a direct trip signal (relay TR1) from the Buchanan switchyard. The Buchanan switchyard south ring bus was isolated from 345 kV output feeder W96 as a result of faults on 345 kV feeders W97 and W98 causing the generator output breakers 1 and 3 to open initiating a direct trip signal from Buchanan. All control rods fully inserted and all required safety systems functioned properly. The plant was stabilized in hot standby with decay heat being removed by the main condenser. The Auxiliary Feedwater System automatically started as expected due to SG low level from shrink effect. The Emergency Diesel Generators did not start as offsite power remained available and stable. The event was recorded in the Indian Point Energy Center corrective action program (CAP) as CR-IP2-2012-03425. A post trip evaluation was initiated and completed on October 31, 2012.

Prior to the RT, on October 27, 2012, at approximately 21:54 hours, the Control Room was notified by Con Edison Central Information Group (CIG) that there was a Hurricane Warning for the entire Con Edison service territory due to the approach of superstorm Sandy which was expected to affect the service territory starting October 29, 2012 at 08:00 hours. On October 29, 2012, at 03:45 hours, the plant entered into operations procedure OAP-008 (Severe Weather Preparations) due to impending severe weather from approaching superstorm Sandy. Additionally, on October 29, 2012, operations experienced several 345 kV grid.

The Main Generator {TB} supplies electrical power at 22kV through an isolated phase bus to two Main Transformers (MT) {EL} which increase the voltage to 345 kV. The 345 kV output of the MTs is sent to the Buchanan Substation South Ring Bus {FK} via 345 kV feeder W96 {EL}. Unit 3 connects with the Buchanan Substation South Ring Bus through motor operated disconnect switch F1-3 on the W96 feeder. At the South Ring Bus, 345 kV Breakers 1 and 3 {BKR} serve to isolate Unit 3 from the Buchanan Substation. Breakers 1 and 3 are also referred to as the generator output breakers {EL} and also serve as ring bus breakers. The Buchanan Substation is where electrical power is distributed to the grid.

345 kV Breakers 1 and 3 will trip open on any of the following conditions: 1) 86P relay trip, 2) 86BU relay trip, 3) Primary Pilot Wire trip, 4) Backup Pilot wire trip, 5) Feeder W97 fault (Breaker 1), 6) Feeder W98 fault (Breaker 3), 7) Low SF-6 gas pressure, 8) Low breaker air pressure, 9) Breaker pole disagreement. The Generator Protection System (GPS) protects the Main Generator from internal and external faults by tripping the generator output breakers 1 and 3. The generator output breakers are tripped by Primary (86P) and Backup (86BU) lockout relays which will also cause a main turbine trip (TT). The turbine protection system includes four spring loaded turbine stop valves, one for each of four main steam lines that are held open hydraulically by the turbine autostop oil system. A TT signal opens redundant solenoid dump valves and hydraulic dump valves which drain the autostop oil removing autostop oil pressure allowing the turbine stop valves to close by spring action.

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Solenoids 20/AST and 20/ASB are energized to dump the autostop oil when a trip is required and can be actuated by, 1) generator trip, 2) RT, 3) SI, or 4) manual trip (note there are several other conditions that cause a turbine trip). The GPS is designed to trip the generator and associated feeder breakers for faults in the generator, Main Transformers, unit auxiliary transformer and the high voltage feeders between the unit and Buchanan Substation including the output circuit breakers at Buchanan. A generator trip logic produces a TT signal for any generator trip signal. The generator trip signals are received by primary lockout relay 86P and backup lockout relay 86BU, which actuate solenoid valves 20/AST and 20/ASB to dump autostop oil resulting in a TT. 345 kV feeders W97 and W98 are distribution feeders from the switchyard owned and maintained by Con Edison.

## Cause of Event

The direct cause of the RT was a turbine trip resulting from actuation of the main generator Primary and Backup Lockout relay 86P and 86BU on a direct trip signal (relay TR1) from the Buchanan switchyard. The cause of the actuation of Primary and Backup Lockout relay (86P and 86BU) was the trip of generator output circuit breakers 1 and 3 due to the loss of feeders W97 and W98. Trip of generator output circuit breakers 1 and 3 was due to a fault on feeders W97 and W98 as a result of damage to Con Edison feeder tower line insulators from the effects of superstorm Sandy. The damaged insulators were on Con Edison 345 kV transmission lines on towers located between the Buchanan switchyard and the Millwood substations.

## Corrective Actions

The following corrective actions was performed:

- Inspection and repair of feeders W97 and W98 by Con Edison.

## Event Analysis

The event is reportable under 10CFR50.73(a)(2)(iv)(A). The licensee shall report any event or condition that resulted in manual or automatic actuation of any of the systems listed under 10CFR50.73(a)(2)(iv)(B). Systems to which the requirements of 10CFR50.73(a)(2)(iv)(A) apply for this event include the Reactor Protection System (RPS) including RT and AFWS actuation. This event meets the reporting criteria because an automatic RT was initiated at 22:41 hours, on October 29, 2012, and the AFWS actuated as a result of the RT. On October 30, 2012, at 00:30 hours, a 4-hour non-emergency notification was made to the NRC for an actuation of the reactor protection system {JC} while critical and included an 8-hour notification under 10CFR50.72(b)(3)(iv)(A) for a valid actuation of the AFW System (Event Log #48454). As all primary safety systems functioned properly there was no safety system functional failure reportable under 10CFR50.73(a)(2)(v).

## Past Similar Events

A review was performed of the past three years for Licensee Event Reports (LERs) reporting a RT from a Turbine-Generator trip due to a feeder failure from severe weather. There were no LERs identified that reported events related to feeder failures.

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## NARRATIVE (If more space is required, use additional copies of NRC Form 366A) (17)

## Safety Significance

This event had no effect on the health and safety of the public. There were no actual safety consequences for the event because the event was an uncomplicated reactor trip with no other transients or accidents. Required primary safety systems performed as designed when the RT was initiated. The AFWS actuation was an expected reaction as a result of low Steam Generator (SG) water level due to SG void fraction (shrink), which occurs after a RT and main steam back pressure as a result of the rapid reduction of steam flow due to turbine stop and control valve closure.

There were no significant potential safety consequences of this event. The RPS is designed to actuate a RT for any anticipated combination of plant conditions including a direct RT on TT unless the reactor is below approximately 20% power. The analysis in UFSAR Section 14.1.8 concludes an immediate RT on TT is not required for reactor protection. A RT on TT is provided to anticipate probable plant transients and to avoid the resulting thermal transient. If the reactor is not tripped by a TT, the primary tripping functions of over temperature delta temperature (OTDT) or over power delta temperature (OPDT) trip would prevent safety limits from being exceeded. Additional tripping functions are provided as a backup for specific accident conditions and mechanical failures. The generator is protected by the generator protection system (GPS) which is designed to protect the generator from internal and external faults by tripping the output breakers. During this event the GPS functioned as designed and initiated a turbine-generator trip. This event was bounded by the analyzed event described in UFSAR Section 14.1.8 (Loss of External Electrical Load). The response of the plant is evaluated for a complete loss of steam load from full power without a direct RT and includes the acceptability of a loss of steam load without direct RT on turbine trip below 35 percent power. The analysis shows that the plant design is such that there would be no challenge to the integrity of the reactor coolant system or main steam system and no core safety limit would be violated. The RT and the reduction in SG level is also a condition for which the plant is analyzed. A low water level in the SGs initiates actuation of the AFWS. The AFW System has adequate redundancy to provide the minimum required flow assuming a single failure. The analysis of a loss of normal FW (UFSAR Section 14.1.9) shows that following a loss of normal FW, the AFWS is capable of removing the stored and residual heat plus reactor coolant pump waste heat thereby preventing either over pressurization of the RCS or loss of water from the reactor. For this event, rod control was in automatic and all rods inserted upon initiation of a RT. The AFWS actuated and provided required FW flow to the SGs. RCS pressure remained below the set point for pressurizer PORV or code safety valve operation and above the set point for automatic safety injection actuation. Following the RT, the plant was stabilized in hot standby.